RISK ASSESSMENT TECHNICAL MEMO

SITE 12 - BUILDING 316 - DPDO TRANSFORMER OIL SPILL AREA, AND

SITE 14 - BUILDING 38 - TRANSFORMER OIL LEAK

NAVAL CONSTRUCTION BATTALION CENTER DAVISVILLE, RHODE ISLAND

Contract No. N62472-85-C-1026
March 25, 1993

TRC Project No. 13990-N41-10

TRC
TRC Environmental Corporation

5 Waterside Crossing
Windsor, CT 06095
☎ (203) 289-8631 Fax (203) 298-6399

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INTRODUCTION

This risk assessment technical memo has been prepared to summarize the risks to human health and the environment posed by existing conditions at Sites 12 and 14 at the Naval Construction Battalion Center located in Davisville, Rhode Island. Based on these risk evaluations, the existence, or lack thereof, of a potential threat to human health and the environment which warrants further action can be evaluated.

Site 12, the Building 316 DPDO Transformer Oil Spill Area and Site 14, the Building 38 Transformer Oil Leak Area have both been investigated for the presence of PCBs in association with transformer oil spills which occurred in these areas. Site 12 is located within Building 316 in West Davisville (see Figure 1), west of the CBC Davisville Main Center. Site 14 is located within Building 38 (see Figure 2), adjacent to Site 06. Following site investigations at both sites, removal actions were conducted, followed by verification sampling events which were conducted by TRC Environmental Corporation (TRC) and the USEPA - Region I.

SITE HISTORIES

At Site 12, a transformer containing PCB oil was accidentally punctured with a forklift in 1977 and the resultant spill area was cleaned up by NCBC-Davisville personnel. Subsequent

sampling indicated the concrete floor was contaminated with PCBs. Aroclor 1260 was detected in the concrete at 91 ppm, and wipe samples exhibited PCBs (Aroclor 1254) at concentrations ranging from 0.4 to 3.0 μg/sq.in. A removal action was implemented in 1991 which involved the removal of PCB-contaminated concrete and subgrade materials from the floor of Building 316. The removal area was approximately 20 feet square, with a contiguous removal area of approximately 4 feet by 5 feet. The six-inch concrete slab and underlying six inches of subgrade were removed.

At Site 14, oil spillage was noted in a transformer storage area within Building 38 in 1981. The resultant spill area is believed to have been cleaned up by NCBC-Davisville personnel. Subsequent sampling indicated the asphalt surface was contaminated with PCBs. Aroclor 1260 was detected in the asphalt at 6,690 ppm. Subsequent wipe sampling identified Aroclor 1260 at concentrations ranging from 0.7 to 17,000 μg/sq.in. A removal action was implemented in 1991. The removal area consisted of an asphalt pavement area approximately 40 feet by 17 feet in area, and a contiguous area approximately 5 feet square. The three-inch thick asphalt layer and underlying six inches of subgrade were removed.

NATURE AND EXTENT OF CONTAMINATION

Confirmation sampling conducted after the removals were completed indicated that the horizontal extent of PCB contamination at each of the sites is more extensive than originally believed.

Confirmation sampling conducted after the removal was completed at Site 12 indicated the presence of PCB contamination in concrete chip samples collected from the remaining

flooring at concentrations as great as 1200 μg/g (ppm). Figures 3 and 4 provide sample locations and detected PCB levels.

At Site 14, chip sample concentrations as great as 150 ppm were detected during the verification sampling. Wipe samples were also collected, with wipe sample PCB concentrations as great as 82 μg/100 cm^2 detected. Figures 5, 6, and 7 provide sample locations and detected PCB levels.

COMPARISON TO APPLICABLE AND RELEVANT OR APPROPRIATE REQUIREMENTS (ARARs) OR TO-BE-CONSIDERED REQUIREMENTS (TBCs)

In evaluating the detected levels of PCB contamination at Sites 12 and 14, state and federal standards and guidance levels were considered. Federal regulations (40 CFR 761.120) developed under the Toxic Substances Control Act (TSCA) are not applicable to site contamination since they apply only to spills occurring after May 4, 1987, but cleanup levels specified under 40 CFR 761.125 may be relevant and appropriate to remediation of Sites 12 and 14. These regulations specify cleaning of indoor solid surfaces to 10 μg/100 cm^2 and remediating soils to 10 ppm by weight for spills in unrestricted areas. Spills occurring before May 4, 1987 are considered existing or old spills for which EPA establishes cleanup standards on a "case-by-case" basis. The Rhode Island Department of Environmental Management (RIDEM) has issued Proposed Amendments to the Rules and Regulations for Solid Waste Management Facilities which define solid waste as including soil, debris or other material with a concentration of PCBs of 10 ppm or greater or which contain 2 μg/100 cm^2 or greater of PCBs as measured by a standard wipe test. RIDEM has also issued Proposed Amendments to the Rules and Regulations for Hazardous Waste Management which define type 6 - extremely

hazardous waste as including waste which contains PCBs at a concentration of 50 ppm or greater, or 10 μg/100 cm^2 as measured by a standard wipe test. Both sites exhibit residual PCB contamination at levels exceeding 10 to 50 ppm (as applied to chip samples) and 2 to 10 μg/100 cm^2 (as applied to wipe samples).

RISK EVALUATION

A quantitative human health or environmental risk assessment has not been conducted for PCBs present at either Site 12 or 14. However, if not remediated, the current PCB levels that remain in the flooring or on other surfaces at Sites 12 and 14 may present a potential risk to human health under current or future site use. Due to the location of the contamination within the confines of Buildings 316 and 38, no associated risks to the environment are anticipated. The contaminated areas are confined within the physical enclosure of the structures. Access to the contaminated areas is provided by entrance doors which are currently locked. Because both buildings are locked and not in use, current human health risks are minimal. Under potential future use conditions, the anticipated use of these buildings is industrial or commercial. The potential occupational exposure in this scenario stems primarily from direct dermal contact with the contaminated surfaces.

The remedial action objectives for these sites are to prevent any further spreading of PCBs and to reduce the human health risk associated with exposures to contaminated surfaces in a future commercial or industrial use scenario. Direct contact with the contaminated surfaces could lead to workers absorbing PCBs through the skin. Data gathered during the confirmation sampling at the two sites after the initial removal actions provide information on the levels of

PCBs in flooring materials at the sites, through chip and/or wipe sample analyses. Unfortunately, essentially no empirical data are available on the relationship between wipe sample results and actual exposure (LaGoy and Garret, 1993). The relationship between chip sample concentrations and actual exposure is even less clear, since these concentrations may be representative of contamination below the surface of the flooring. However, an evaluation of the potential risk posed by the presence of the PCBs in the surface materials can be made through the use of exposure assumptions.

Assuming that a worker has extensive contact with the contaminated floor surface, such that the worker in the course of his/her job kneels on the floor and places a hand on the contaminated floor, and this contact leads to a transfer of PCBs over the entire hand surface area, the resultant hand concentration can be estimated. Using a conservative scenario which assumes an exposure concentration of 82 $\mu g/100\ cm^2$ (the maximum detected PCB concentration found in a wipe sample), an 840 cm^2 surface area for a worker's hand, a transfer factor of 10% accounting for the transfer of PCBs from the floor surface to the hand, percutaneous absorption of the PCBs of 6% (USEPA, 1993) and a 70 kg male worker, the resultant absorbed PCB dose would be 59 nanograms/kg/event. Further, using conservative assumptions about exposure frequency and duration (i.e., assuming an exposure frequency of 2 events per week, 50 weeks per year, for 25 years), this estimated dose corresponds to an estimated lifetime cancer risk of four in one hundred thousand (i.e., 4×10^{-5}). Under current federal policy, an increased probability of developing cancer of 10^{-6} as a result of site exposure is used as a point of departure for determining the potential need for remediation, with a target risk range of 10^{-4} to 10^{-6} applicable to remedial actions. The estimated existing cancer risk exceeds this point of

departure, indicating a potential need for remediation. RIDEM considers any estimated existing cancer risk exceeding 10^{-6} a potential cancer risk which may require remediation.

As discussed in the previous section, cleanup standards for PCBs on solid surfaces and in soils, although not directly applicable to Sites 12 and 14, have been set under TSCA (10 $\mu g/100\ cm^2$ for indoor solid surfaces and 10 ppm for soils in unrestricted areas). RIDEM has also proposed amendments to solid waste regulations which define solid waste as including surfaces which contain PCBs at concentrations of 2 $\mu g/100\ cm^2$ or more and soil, debris or other material which contain PCBs at concentrations of 10 ppm or more. These cleanup levels have been developed to be protective based on the media to which they apply. This can be verified by using the exposure assumptions described above to estimate the occupational health risk associated with remediating the site to the above-referenced standards. Assuming that the contaminated area is remediated to the proposed RIDEM solid waste surface concentration standard of 2 $\mu g/100\ cm^2$, the resultant absorbed PCB dose would be 1.44 nanograms/kg/event, with an associated estimated cancer risk of one in a million (i.e., 1×10^{-6}). Therefore, remediation of Sites 12 and 14 in accordance with the TSCA and proposed RIDEM solid waste levels of 10 ppm and 2 $\mu g/100\ cm^2$ will reduce long-term risks to workers from exposure to contaminated floor surfaces.

CONCLUSION

The detected levels of PCBs remaining in the flooring materials at Sites 12 and 14 present a potential threat to human health under future commercial or industrial site use. By complying

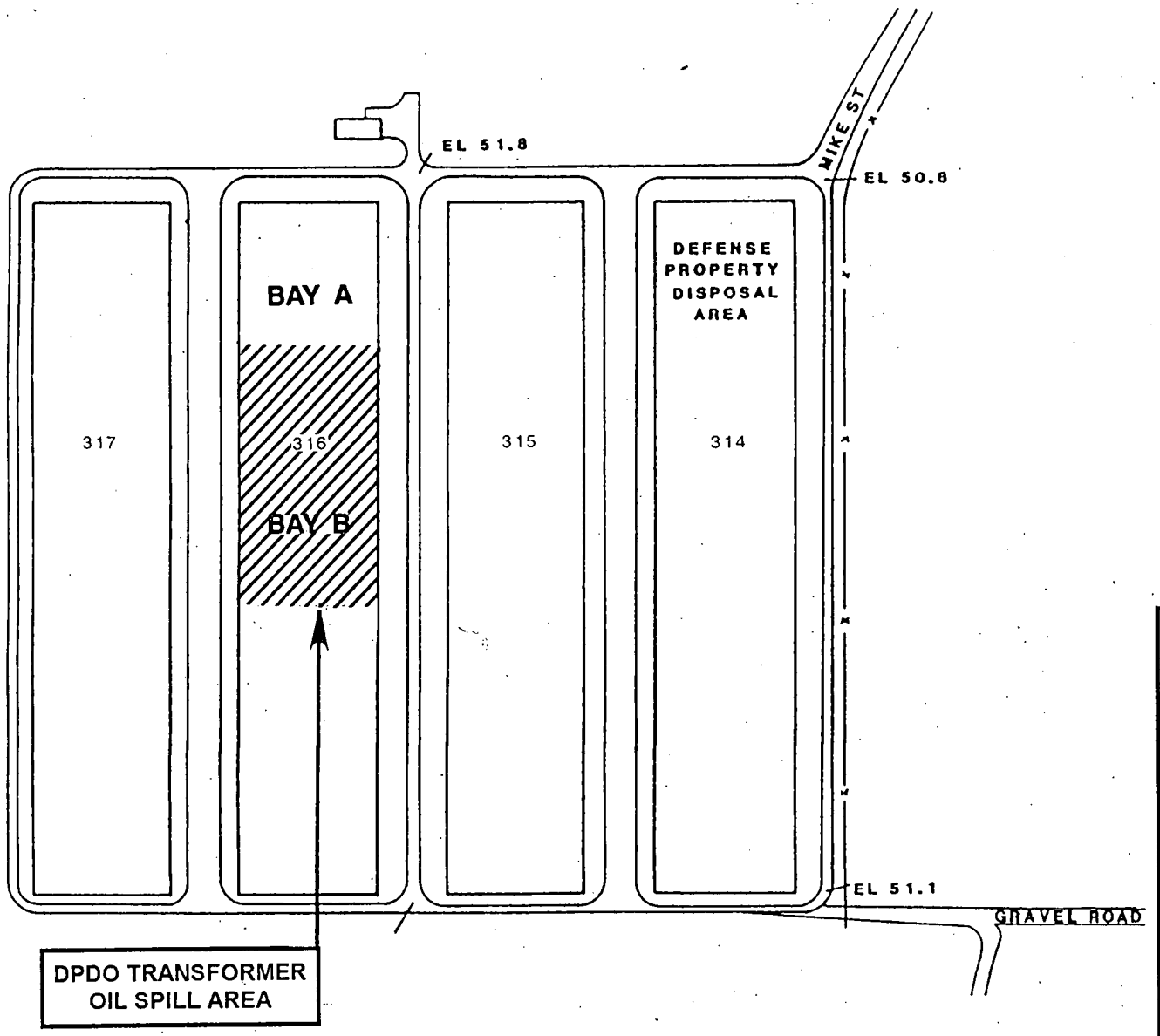
with the federal and state PCB cleanup levels, these threats will be addressed and overall protection of human health will be provided in the occupational setting.

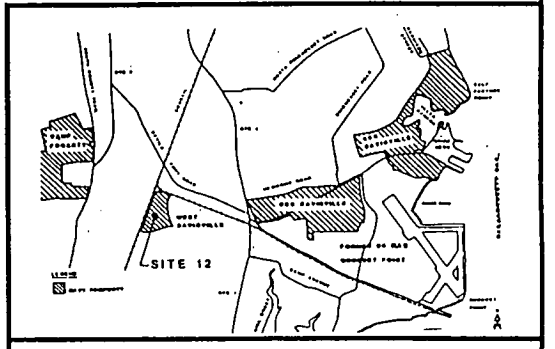
REFERENCES

LaGoy, P.K. and J.S. Garret (1993) Cleanup levels for PCBs and their combustion products at an industrial facility. Remediation, Volume 3, Number 2, Spring 1993.

Ryan, E.A., E.T. Hawkins, B. Magee, and S.L. Santos (1987) Assessing risk from dermal exposure at hazardous waste sites. **In:** Superfund '87, Proceedings of the 8th National Conference, November 16-18, 1987, Maryland: Hazardous Materials Control Research Institute.

USEPA (1993), Personal Communication, March 15, 1993.





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0 100 FT

SCALE

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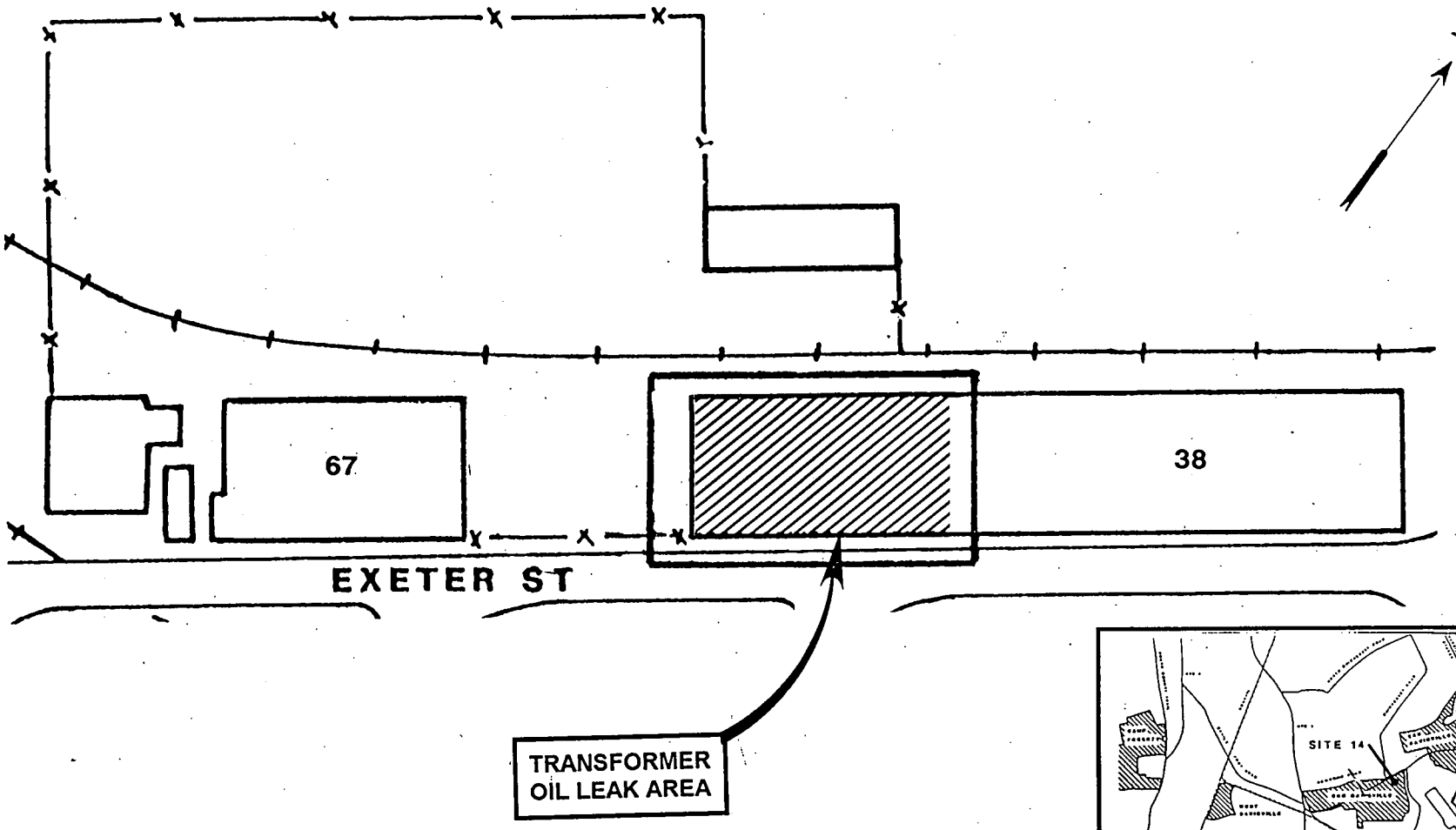
Figure 1. Site 12: Building 316 DPDO Transformer Oil Spill Area



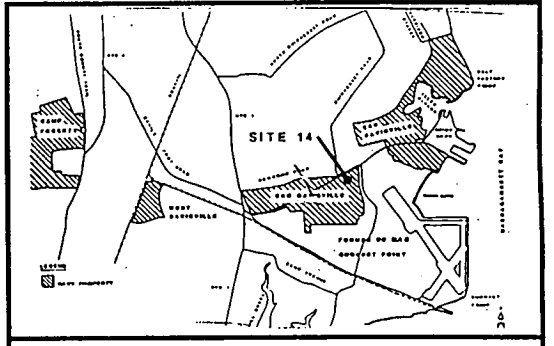


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Figure 2. Site 14: Building 38 Transformer Oil Leak Area

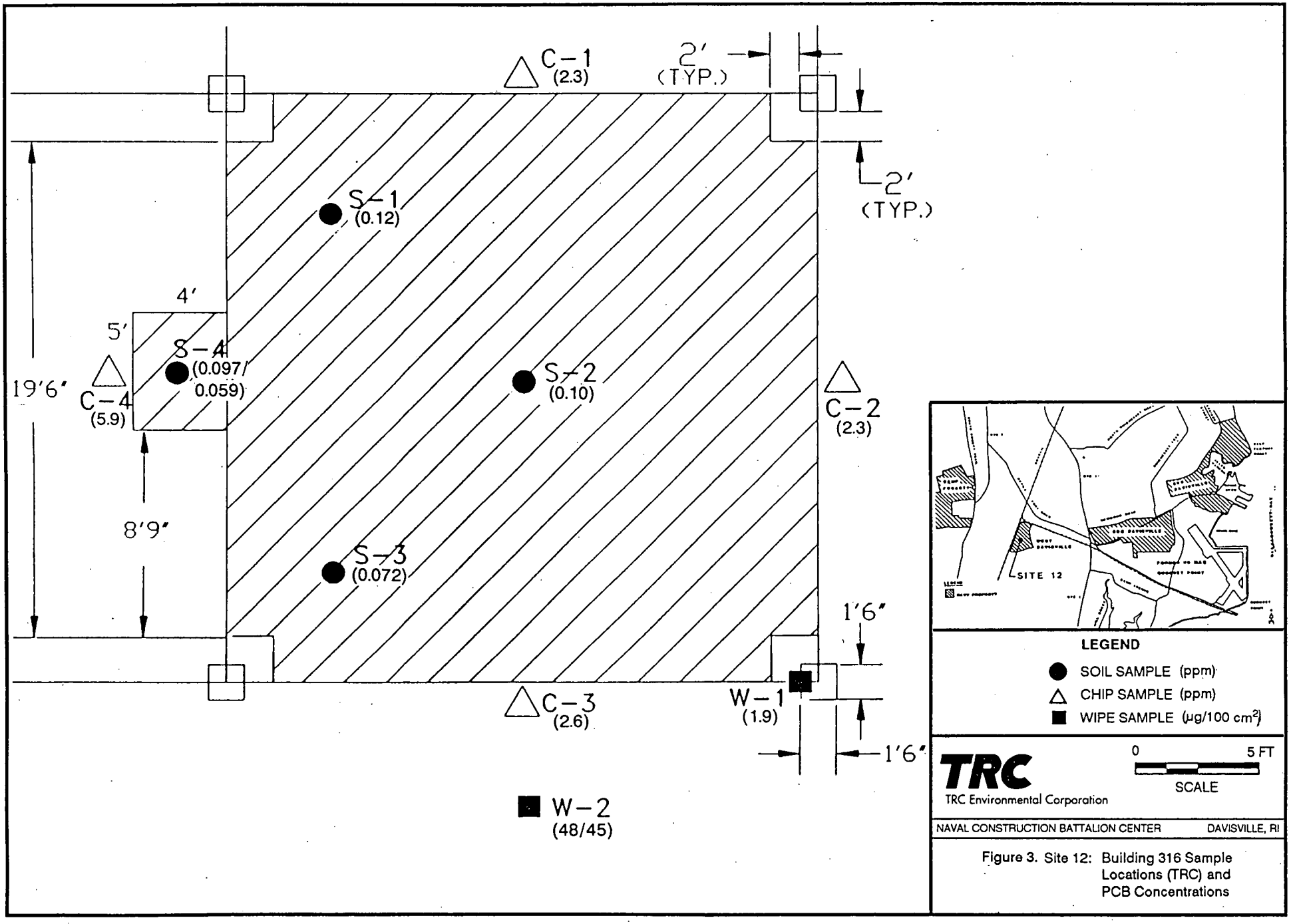
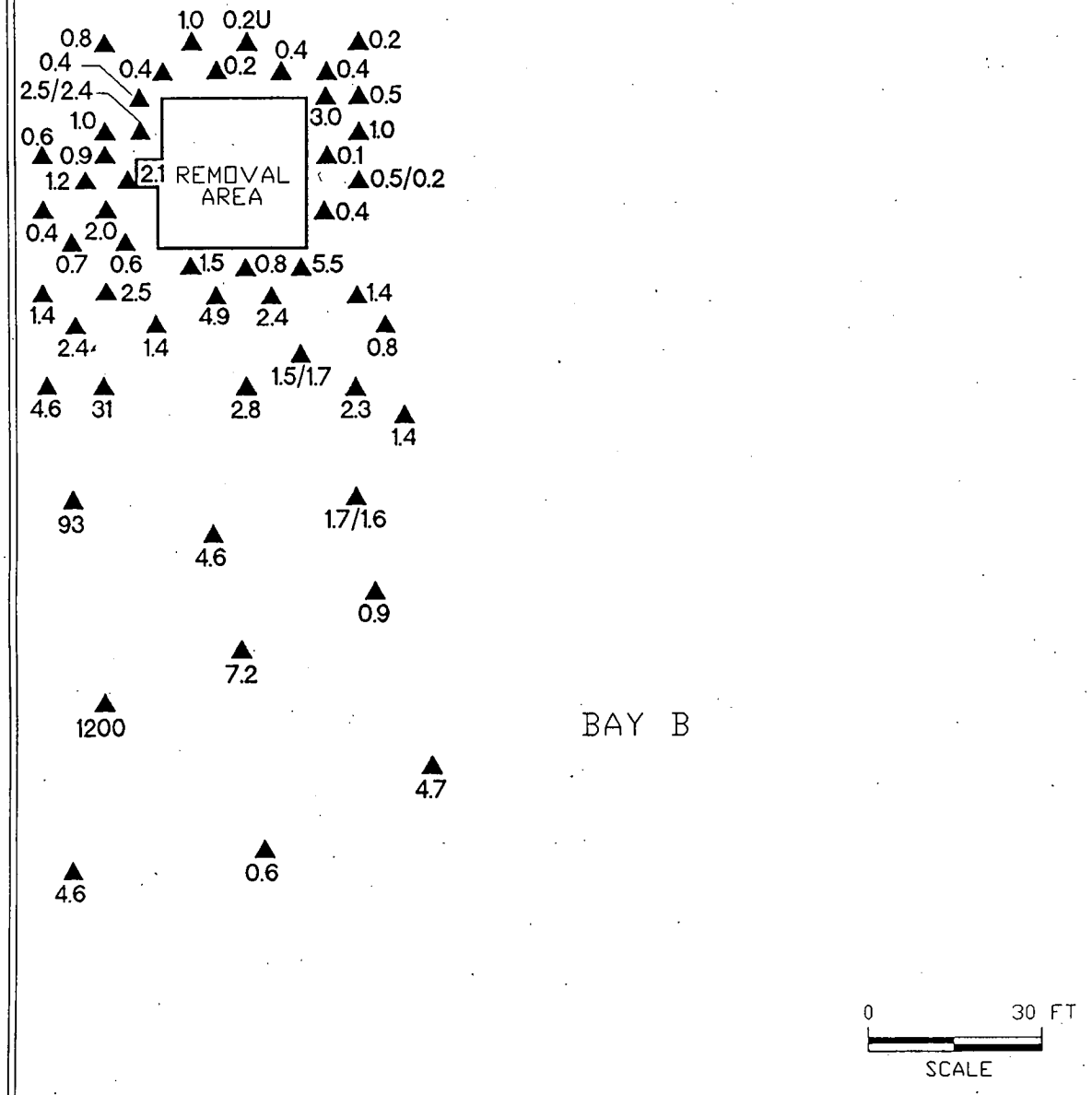


Figure 3. Site 12: Building 316 Sample Locations (TRC) and PCB Concentrations



LEGEND

4.7	SAMPLE CONCENTRATION ug/gm (wetwt)
0.2U	ANALYZED FOR BUT NOT DETECTED
0.5/0.2	SAMPLE/SAMPLE DUPLICATE RESULT
▲	CHIP SAMPLE LOCATION

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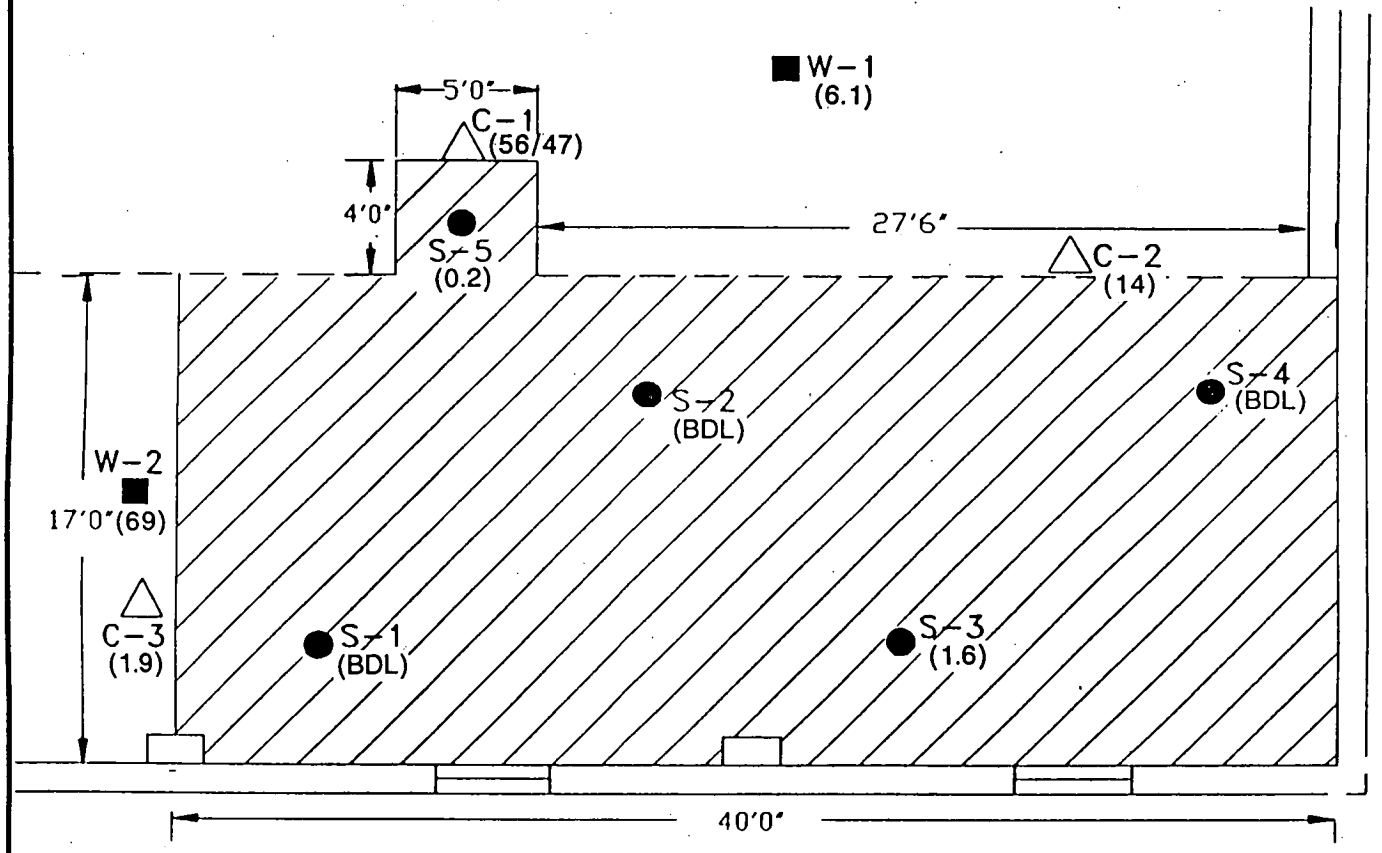
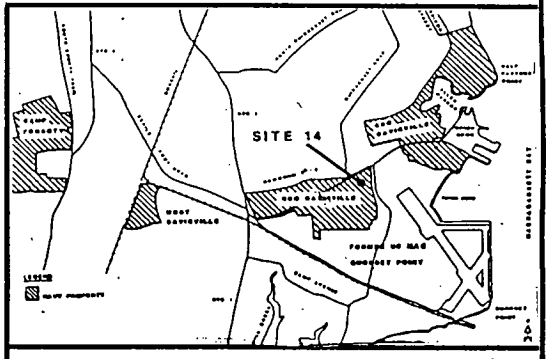
FIGURE 4.
SITE 12: Building 316
Chip Sampling Locations (USEPA)
& PCB Concentrations

Date: 12/92 | Drawing No. 13249-N41-10



BDL = Below Detection Limit



LEGEND

- SOIL SAMPLE (ppm)
- CHIP SAMPLE (ppm)
- WIPE SAMPLE (ug/100 cm^2)

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0 5 FT

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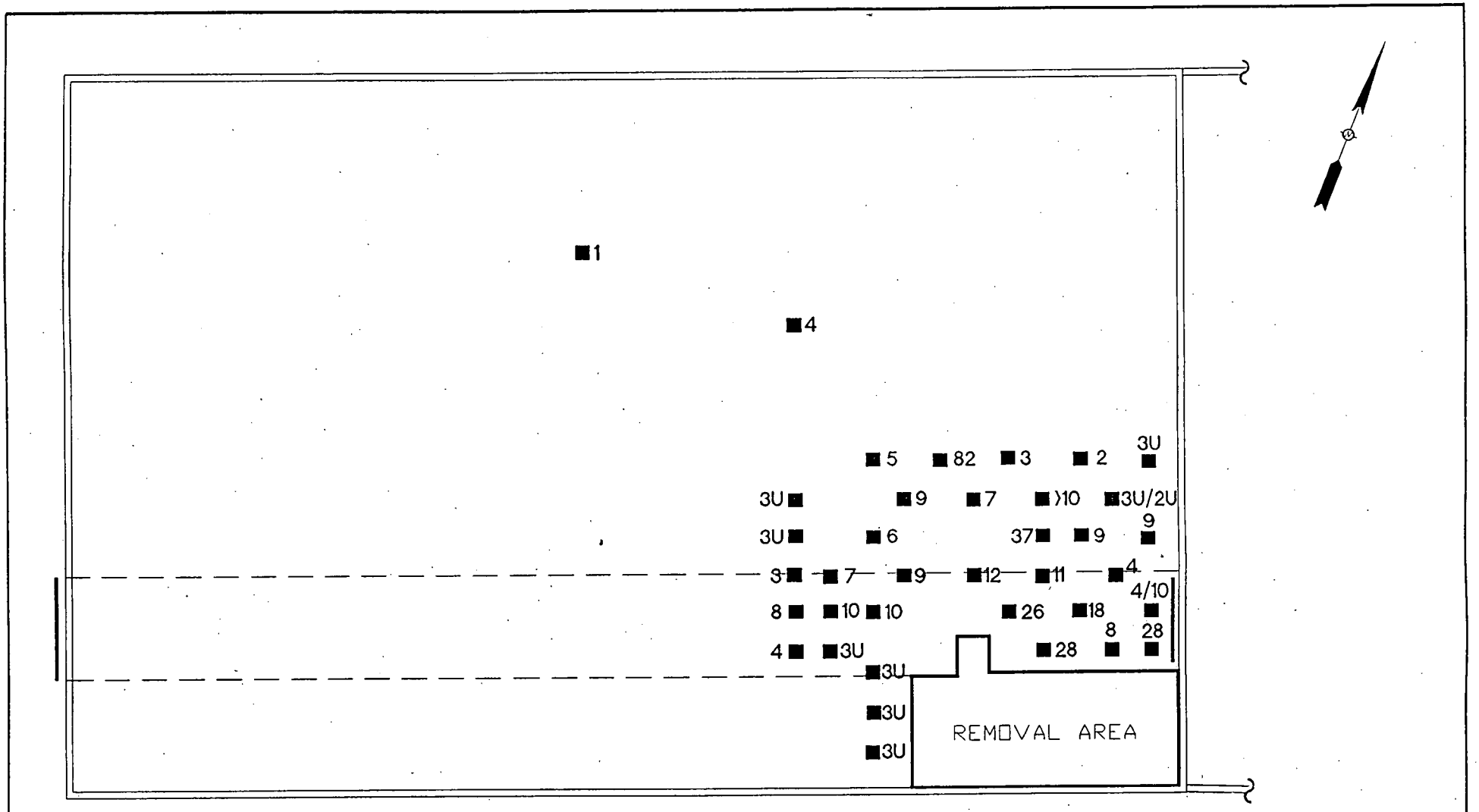
Figure 5. Site 14: Building 38 Sample Locations (TRC) and PCB Concentrations



LEGEND

10	SAMPLE CONCENTRATION (ug/100 cm^2)
3U	ANALYZED FOR BUT NOT DETECTED
4/10	SAMPLE/SAMPLE DUPLICATE RESULT
■	WIPE SAMPLE LOCATION

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FIGURE 6.
SITE 14: Building 38
Wipe Sample Locations (USEPA)
& PCB Concentrations

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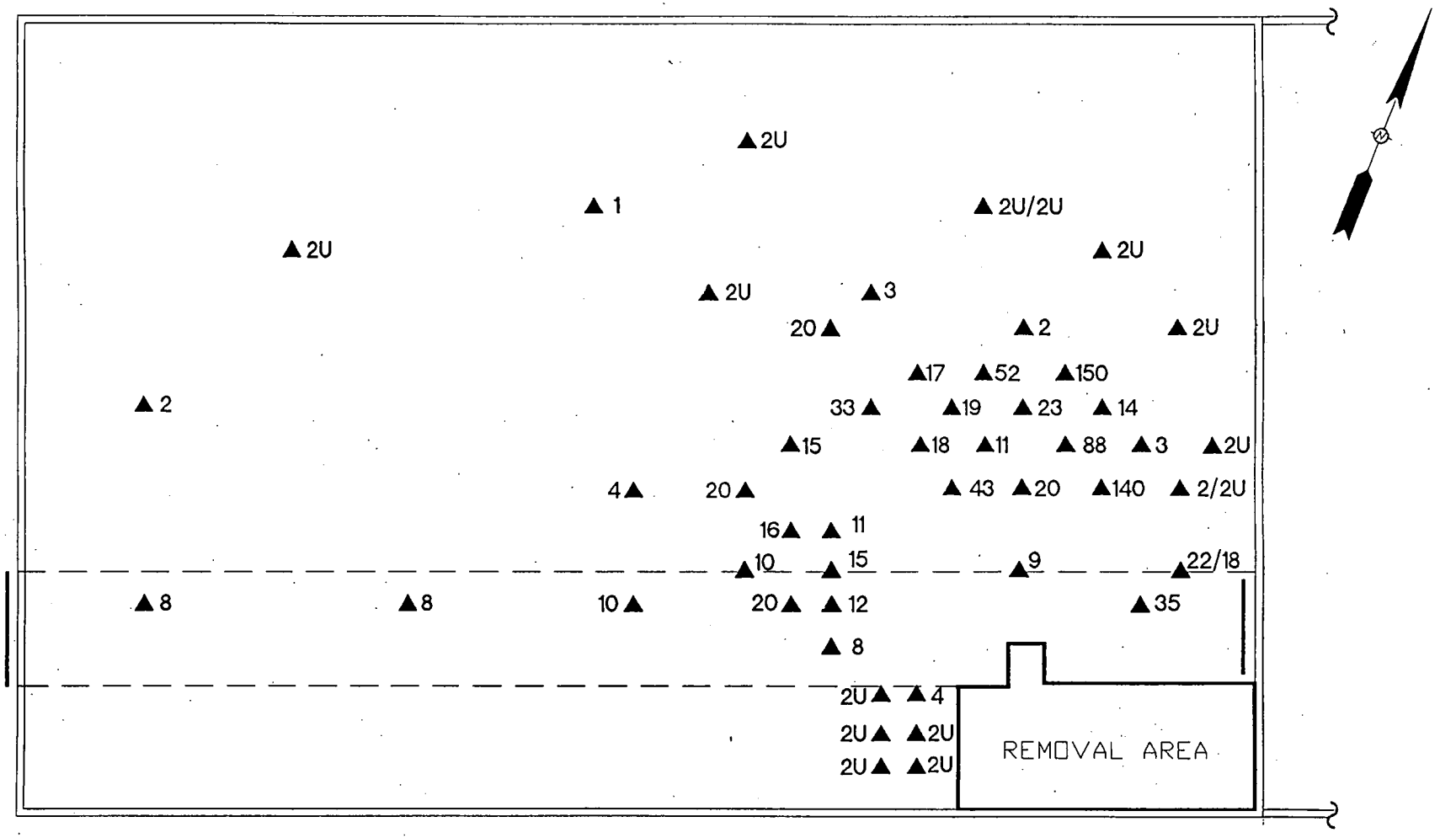

0 20 FT

SCALE

LEGEND

11	SAMPLE CONCENTRATION ug/gm (wetwt)
2U	ANALYZED FOR BUT NOT DETECTED
22/18	SAMPLE/SAMPLE DUPLICATE RESULT
▲	CHIP SAMPLE LOCATION

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FIGURE 7.
SITE 14: Building 38
Asphalt Chip Sampling Locations (USEPA)
& PCB Concentrations

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